

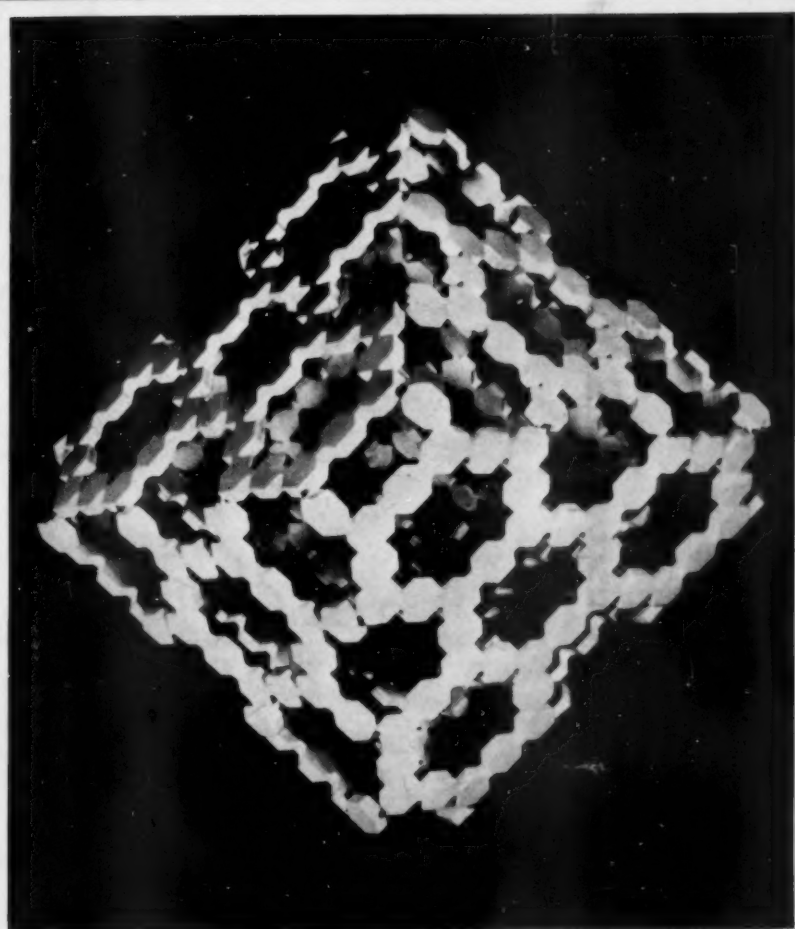
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SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE •



September 25, 1937

Life Saver

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DO YOU KNOW?

Pipe organs in Roman days were operated by water power.

Columbia University has 42,000 volumes on China and Japan in its library.

The majority of desert animals are sandy colored, matching the dry vegetation and bare ground.

As long ago as 430 B.C., a Greek physician observed the injurious effects of dust on the lungs of workmen.

An entire mining town—machinery, food, people—was recently moved from one Canadian point to another by airplane.

For the first time, the famous scene of Prometheus bringing down fire from heaven has been clearly identified on an ancient Greek vase.

Good roads are helping America's crowded cities to "decentralize," by causing a suburban band five to ten miles wide to develop.

The Costa Rican government has ordered that a first aid kit containing specified articles be kept in every factory, school, hotel, and certain other institutions in the country.

About half of Russia's vodka is now used in making synthetic rubber.

Weaver birds are as common in Africa as sparrows and finches in America.

Sowing rice from an airplane was tried this year in California's Imperial Valley.

Even the activity in an anthill is used by German teachers to illustrate German principles of politics and sociology.

As part of the health routine in the Japanese army, troops line up and each man massages the shoulders of the man in front of him.

An oceanographer advances the theory that the water at some California beaches is cold because prevailing winds carry away the warm top layer.

Poison sprays used on farm crops are suspected of causing deaths of many small birds, but how many are thus killed cannot be learned.

Everyday names for birds, says the Scientific Monthly, generally come from one of these features: color; voice; form, either as a whole or in detail; or some striking peculiarity in habit.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

ARCHAEOLOGY

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GENETICS

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ICHTHYOLOGY

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RADIOLOGY

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What test proves whether an infant died before or after birth? p. 196.

ASTRONOMY

New Flaming Super-Nova; Second Within Fortnight

The Seventeenth That Astronomers Have Ever Known,
Brilliant "New Star" is Too Distant for Unaided Eye

A SECOND super-nova five hundred million times as bright as the sun is announced by Dr. Fritz Zwicky of the California Institute of Technology. (See SNL, Sept. 11).

Discovered on a photograph taken at Palomar Mountain on Sept. 10, the new super-nova, like that found on August 29, is in a remote extragalactic system, in this instance NGC 1003 in the constellation of Perseus, at a distance of at least seven million light years.

In spite of its enormous luminosity, the super-nova is so distant that it appears as only a faint telescopic star of magnitude 10.5. The date of its outburst is unknown.

Photographs of the spectrum of the new star, taken at the Mount Wilson Observatory of the Carnegie Institution of Washington by Milton Humason on Sept. 12, show the broad bands characteristic of super-novae. Further confirmation of the remarkable character of the star was obtained by Dr. Walter Baade of the Mount Wilson Observatory staff. Dr. Baade, by determining the distance of the spiral system of stars within which it occurs, found that the intrinsic brightness of the super-nova, at the lowest estimate, is absolute magnitude minus 16.2, or about ten times that of all the rest of the stars in the spiral system of which it is a member.

Too Far Away

The suggestion made by Dr. Baade and Dr. Zwicky in 1934, that the explosive outbursts of super-novae may possibly play a part in producing cosmic rays, probably cannot be tested in the case of either of the two super-novae. Their distances are too great for any noteworthy effect to be expected.

Nevertheless, observers of cosmic rays will carefully examine their records covering the appearance of these new stars, since the nature and amount of any possible effect is still uncertain.

The discovery of the new super-nova was made through use of the 18-inch Schmidt telescope, a small instrument with a wide and roving eye. Perched on Mt. Palomar in southern California,

it is a sort of pilot for the giant 200-inch telescope now building which in a few years will see deeper into space than any other aid to human vision.

By discovering two super-novae, the 16th and 17th the world of astronomy has known, within a fortnight, this Schmidt telescope in the hands of Dr. Zwicky has become a famous instrument. It promises to make many more discoveries.

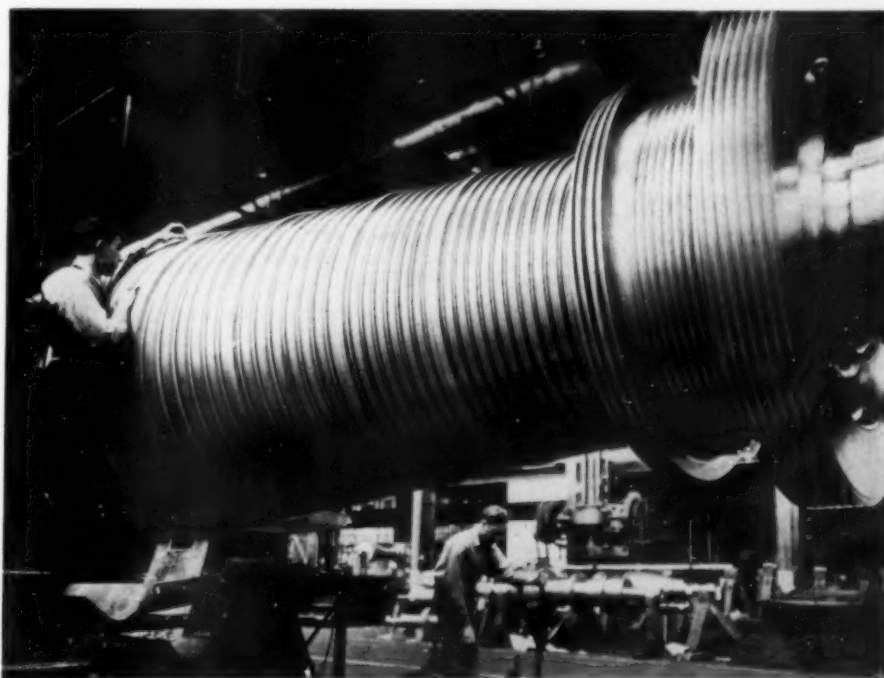
In its work of discovery, the Schmidt instrument is teamed with the famous 100-inch telescope of the Carnegie Institution's Mt. Wilson Observatory near Pasadena. The Schmidt instrument scans the sky for interesting events. It covers a portion of the sky many hundreds of times larger than does a large reflecting instrument and many pictures can be

made in a single clear night. It is also less sensitive to atmospheric disturbances.

Once the discovery is made by means of the Schmidt instrument, then the heavier astronomical artillery comes into action. The great 100-inch telescopes and lesser mirrors make detailed studies. This was the course of discovery in the case of the two distant, flaming "new" stars that have exploded with such brilliance that they are to astronomers today's most intriguing objects in the sky.

Famous among the rare super-novae of the past is Tycho's star, which appeared in November 1572 and was for some days visible in daylight and brighter than Venus at her best. Another temporary star, observed by Kepler in 1604, was as bright as Jupiter and remained visible for two years. These were much closer to the earth than the super-novae just discovered by Dr. Zwicky and were therefore seen by the unaided eye.

More frequent are temporary or "new" stars giving out less light. These ordinary novae are not in the same class with the super-novae. But they attract much attention, both on the part of lay observers of the stars and the astrono-



FOR STEAM "WINDMILL"

Ready to be "bladed" is the above 30-ton piece of steel built to serve as the hub for a giant steam turbine in Kansas City, Kansas. One of the heaviest single-piece rotors ever cast, hundreds of blades for the turbine will be set around its outside along the grooves visible in the photograph. Westinghouse is the builder, East Pittsburgh, Pa. the location of the factory.

mers. Nova Herculis which burst forth shortly before Christmas 1934 was a spectacular ordinary nova.

Scientists speculate on what remains of novae when they fade away. One suggestion is that they become stars consisting of neutrons with no ordinary matter in their make-up. The neutron is one of the basic building blocks of matter and it was discovered in 1934. Such a spent star of neutrons would be extremely dense. The earth's mass on

the same density would be a ball less than two miles diameter.

The outburst of a nova transcends in magnitude all other known physical catastrophes. Astronomers do not know just what happens. Favorite among theories is that there is a tremendous release of energy within the atoms of matter composing the star. Another suggestion is that novae occur when two stars collide.

Science News Letter, September 25, 1937

RADIOLOGY

X-Rays Kill Living Cells By Suffocation; Cancer Clue

Radiologists Hear That Heat Aids X-Ray in Killing Cancer Cells; X-Ray Gives New Test for Life

X-RAYS kill living cells by suffocating them, it appears from studies reported by Drs. Hillyer Rudisill, Jr., and J. Hampton Hoch, of the Medical College of the State of South Carolina, at the Fifth International Congress of Radiology, meeting at Chicago.

The findings, in the opinion of the investigators, also show why cancer cells are more susceptible to X-rays than normal cells, and may "supply the successful answers to the question, Why cancer?"

Yeast cells were the guinea pigs in the studies. When these cells are X-rayed, the investigators found, certain coenzymes essential for the breathing process of the cells are inactivated by the nascent hydrogen and hydrogen peroxide produced by the X-rays. Once the coenzymes are inactivated they cannot play their part in the complicated mechanism by which cells get their oxygen, and thus deprived of oxygen the cells die. The inactivated coenzymes cannot be reactivated.

Cancer cells, like actively growing cells such as are found in embryonic tissues, have a "greater speed of life" than normal cells, Dr. Rudisill pointed out. It is this, he believes, which accounts for their greater sensitivity to X-rays and radium.

Nothing is known of how the cell produces the coenzymes that help it to breathe, Dr. Rudisill observed, and the substances which normally protect the coenzymes from destruction are also unknown. Investigation of these two

points, he believes, are likely to answer the question of why cancer develops.

Heat May Hasten Killing

Applying heat to the area that has been X-rayed should hasten the destruction of cancer cells, while chilling the area X-rayed should lessen the danger of skin burns from the powerful rays.

These tips, of probable value to physicians treating cancer and other conditions with X-rays, were gained from studying the effect of another kind of rays, ultraviolet, on a protein like egg white. The study was reported by Dr. Janet Howell Clark of Baltimore.

Dr. Clark studied the effects of radiation on proteins because these chemicals are found wherever there is living matter, so the way they react to radiation gives a good indication of how living tissue, normal or cancerous, may react.

The effect of the rays on proteins depends, Dr. Clark found, on the nature of the protein, whether it is in acid or alkaline solution, and the salts present. One change, called denaturation, occurs in all protein solutions when exposed to radiation, regardless of temperature, alkalinity or acidity. Denatured protein cannot act as a constituent of a living cell.

Denaturation must be followed by an increase of temperature before the next change, visible flocculation, takes place.

Denaturation of the protein in a living cell may be enough to kill the cell, but this is not yet definitely known. Fur-

ther study is needed to clear up this and other important points about the effect of radiation on cell life. Experiments have shown, however, that when cells are kept at low temperatures after radiation they show less injury than cells kept at higher temperatures. This, Dr. Clark suggested, may have applications in X-ray and radium treatment.

Test of Life

An X-ray test of life was reported by Dr. J. G. Dillon of Moscow to the Congress.

The test may have legal significance, since it gives definite proof, according to Dr. Dillon, as to whether or not an infant apparently born dead actually lived after birth, even if only for a short time.

An X-ray life test, Dr. Dillon said, "makes it possible to have a permanent document possessing the force of court decisions."

The test is made by taking an X-ray picture of the infant's body. If the picture shows the presence of air in the stomach, it is considered proof that the baby lived.

The test is based on the theory that the stomach and digestive tract can play a part in breathing, or respiration, along with the lungs. Dr. Dillon presented scientific evidence in support of this theory, and stated in conclusion:

"Thus if air in the stomach is the result of inhalation it is clear that the presence of air in the digestive tract of a new-born serves as proof of the extra-uterine respiration and hence a proof of the infant being born alive."

An X-ray examination of the stillborn in any stage of its life before birth, Dr. Dillon continued, never shows any traces of air in the digestive tract. On the other hand correctly made X-ray pictures of dead infants that were breathing even a very short time always disclose presence of air in the stomach or other part of the digestive tract, no matter how small its quantity may be. Such air, in Dr. Dillon's opinion, is not swallowed air, but air that was actually drawn into the infant's body by a sort of stomach breathing.

Neutrons Effective

Neutrons are five times as effective as X-rays in destroying breast cancer of mice, Drs. John H. Lawrence, Paul C. Aebersold and Raymond E. Zirkle of Berkeley, Calif., reported.

Neutrons are the new atomic particles without electric charge discovered in 1932. Unlike X-rays, Dr. Lawrence ex-

plained, neutrons can penetrate dense substances such as lead but are absorbed by lighter materials such as tissue which is rich in hydrogen. Since their discovery, it has been hoped that they would prove a potent weapon against cancer, but proof of this has so far been lacking.

Dr. Lawrence and associates compared the killing or growth-checking effect of neutrons and X-rays on wheat seedlings, drosophila eggs, fern spores, a transplantable breast cancer of mice and whole normal mice. The neutrons were more effective than the X-rays in every case, but in different degrees. They were two times as effective on drosophila eggs, five times on wheat seedlings, four times on normal mice, five times on the breast cancer, and two and one-half times as effective on fern spores.

The results of these studies seem to indicate that neutrons may be able to single out from the rest of the body and destroy the cells of some kinds of cancers.

Bronchial Disease Yields

About half of a group of 55 patients suffering from a troublesome bronchial disease were relieved, and some apparently cured, for periods ranging from one to five years after X-ray treatments, Drs. Maurice Berck and William Harris of New York City reported.

The disease is known medically as chronic suppurative bronchiectasis. Paroxysms of coughing with copious expectoration and fetid breath are the chief symptoms. The condition is one in which the bronchi or a single bronchus have become dilated, often as a result of infection.

X-ray treatment of this disease was carried out on a group of patients over a period of five years at Mt. Sinai Hospital, the physicians reported. The improvement in about half the cases varied from "moderate to practically complete cessation of symptoms."

Radium Detective

A radium detective which aids in the discovery of lost or stolen radium was described by Dr. Robert B. Taft of Charleston, S. C. Radium is so expensive that the loss of even a small amount is a matter of considerable concern.

"Radium gets into strange places," Dr. Taft commented. "I recently aided a radiologist who was rowing around in a boat trying to detect his radium in a pond."

"Much of the work of seeking the radium in former times was done with an electroscope. Now the Geiger-Muller



NEW ISLAND

From the muddy waters of San Francisco are already appearing, at left, the mile-long man-made island which will mark the site of the Golden Gate International Exposition of 1939.

counter, an instrument for detecting small amounts of Gamma and some other rays, which is a sealed tube containing a gas compressed at sub-atmospheric pressure, is proving highly successful as a radium detective.

"The entrance of any radiation into the tube breaks down the space between the electrodes, causing an impulse which may be magnified to operate a loud speaker. These counter tubes are so super-sensitive they can even record cosmic rays.

"Radium may be detected through water, through dirt and stone and brick. We experimented in an indoor swimming pool, and found that the counter showed the presence of radium.

"To find the radium with the counter you simply walk around the suspected area and when the tube shows a double amount of activity over the usual detection of cosmic rays, counting the impulses in the tube leads to the discovery of the metal."

Radium, because of its value, is sometimes stolen. The radium detective may help recover it in such cases, too, but Dr. Taft warned against seeking the radium openly in suspected houses, saying that failure to find the elusive metal might lead to lawsuits.

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ENGINEERING

Build Mile-Long Isle In San Francisco Bay

THIRTY million cubic yards of black bay sand have been sucked from the bottom of San Francisco Bay and pumped into a giant seawall enclosure to make the site of the Golden Gate World's Fair of 1939.

The result is a man-made island a mile long and nearly a mile wide, located between the towering Golden Gate Bridge and the seven-mile San Francisco-Oakland Bridge.

"Treasure Island," as the Exposition site has been named, was reclaimed from the shoals of the largest landlocked harbor in the world. Work on the island began in February, 1936, when United States Army Engineers, in cooperation with Exposition workers, started America's largest dredging job. Eleven giant dredges, 1,000 men, and a daily 24-hour schedule were employed for a year and five months to suck 100,000 cubic yards of sand each day from shoals beneath the Bay and pump it into a huge square rimmed by a stone seawall more than three miles around. The island rests on a shoals area from six to twenty-five feet under water, and



HOW IT WILL LOOK

Artist's conception of the completed fair grounds which will be reached by a causeway from the San Francisco-Oakland Bay bridge. The only permanent structures on the island will be two airplane hangars seen at right foreground. The island eventually will become San Francisco's airport.

extends thirteen feet above the surface.

Today it stands 100 per cent. completed, with only the final surfacing yet to be done. Before this surfacing is undertaken, however, the island will be given a bath. To make way for a \$1,300,000 landscaping and horticulture program, sand in the island must be "unsalted" before trees, shrubs and flowering plants can be successfully transplanted. This will be done by a process called "leaching," which consists of keeping the ground continually

soaked and drained with fresh water until the last grain of salt has been sent back to the sea.

Already the huge structure has brought about a noticeable effect on tides and currents in the Bay. U. S. Army Engineers and experts of the U. S. Coast and Geodetic Survey, after taking daily measurements of tides and currents for the last month, report that the unnatural square mile of earth has perceptibly changed their flow.

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PHYSIOLOGY

"Iron Lung" In Reverse Used to Study Breathing

ARTIFICIAL fever and an apparatus working like the so-called "iron lung" in reverse are now making possible new studies on what happens when animals like dogs, cats and rabbits use their specialized type of respiration known as panting. Allan Hemingway, Yale University chemist from the school of medicine, described how the animal's intake of air was measured by the "reverse" iron lung, before the meeting of the American Chemical Society in Rochester, N. Y.

The animal lies in the metal chamber with only its neck protruding through

an air-tight seal. Every time it breathes it forces air in and out through special valves. The flow of air can be accurately measured.

While in the chamber the animal is subjected to artificial fever from diathermy machines. Soon the animal starts panting to establish a constant body temperature despite the excessive heat. Faster and faster the animal inhales and exhales the air to evaporate moisture from the tongue, mouth tissues and the upper part of the throat. Only these small areas, said Mr. Hemingway, provide the surface by which the animal

must maintain even temperature. In man and horses, in contrast, sweat glands all over the body secrete water whose evaporation controls temperature.

Object of the Yale experiments was to study the effect of the rapid flow of air on the blood in the dog's panting method of keeping cool. One bad effect is that a too rapid motion can blow carbon dioxide out of the blood. Some carbon dioxide is needed in the blood stream in the form of the mild carbonic acid. When the carbonic acid content of the blood is reduced the normal acid-alkali balance in the blood stream is changed. In severe cases of carbon dioxide loss tetany develops; a morbid state characterized by intermittent muscular spasms.

The new Yale apparatus was designed to provide exact knowledge of the conditions in which tetany may occur. The project is part of a more general program of research on the chemical and physical temperature regulating mechanisms of the animal body and the ability of these mechanisms to withstand heat changes.

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PHYSICS

Heat Instead of Light For Heavy Weather Signals

FOG, shipping's deadliest enemy, appears one step nearer defeat with the announcement of successful heavy weather signaling by means of the Hayes Radiometer.

Tests have proved the practicability of the radiometer, originally invented as an extremely sensitive device for measuring heat radiation, its inventor, Hammond V. Hayes of Boston, reports (*Review of Scientific Instruments*, September).

The instrument makes practical the long hoped-for means of signaling by use of heat radiation instead of light. Heat rays penetrate foggy and thick atmosphere much more strongly than does light.

Boston harbor during the last winter was the trial ground for the radiometer, which is being improved as a result of the first experiments. Signals were sent successfully a distance of more than a mile and a half on days when visibility was so poor that objects situated much nearer than the heat source could not be picked out.

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Firm tomatoes may be stored for 20 days without losing much Vitamin C, it is found.

FOOD TECHNOLOGY

Bacteria Grown to Order; Make Butter Uniform

Non-Explosive Cheese, Possible Need for Black Cans, Gland Injections for Bossy Described to Conference

DAIRYMEN may shortly cultivate certain types of bacteria and add them to cream to be churned into butter to insure a more uniform product of better quality.

This unusual procedure was outlined to the Food Technology Conference at the Massachusetts Institute of Technology, Cambridge, Mass., by Dr. M. E. Parker of the American Association of Creamery Butter Manufacturers.

The quality of butter, he explained, is largely dependent on its taste and aroma, which in turn are due to certain chemical compounds found in butter in varying amounts.

Concentrations of as little as two to four parts per hundred thousand of such chemicals give the desired butter flavors but these compounds must be produced by bacteria from the raw material, cream, from which butter is churned.

Until now the occurrence of the right type of healthful and helpful bacteria which produce these flavoring substances has been left to chance, much the same as wine distillers formerly allowed wild yeasts to ferment the grapes.

Scientists are now working on the problem of adding distillates from pure cultures of these same bacteria, grown to order, to butter to help produce a more uniform product.

Ozone Set to Work

Ozone, that pungent gas so frequently associated with an electric motor while it is running, may be the next substance set to work by food chemists in the never-ending campaign against germs and molds which hinder food storage, the Conference learned.

Increased use of the gas, a form of oxygen sometimes used as a bleach, was predicted by Prof. Arthur W. Ewell of the Worcester Polytechnic Institute.

Eggs stored in ozone for eight months, he declared, are indistinguishable from those but a few days old and meat can be stored up to 60 days in it with no mold or slime forming.

Better equipment and further knowledge of how to use the gas are pre-

requisites to its further development, the chemist concluded.

Non-Exploding Cheese

Canned cheese that will not "explode" and that will come to the consumer without the customary rind appears a probability.

A special one-way valve that lets out gas formed during the fermenting of the cheese, which continues even while the package is standing on the grocer's shelf awaiting sale, but still keeps out mold- and germ-carrying air was described at the Food Technology Conference by Dr. L. A. Rogers of the U. S. Bureau of Dairy Industry.

Previous attempts of the cheese industry to use cans for their products have been stymied by the fact that gas formed in the cheese after canning caused the can to swell up, and if the process continued long enough, finally to burst, much as those containing home brew beverages.

Rind formation is also checked in the new type package, Dr. Rogers declared.

Gland Injection For Cows

How an extract of the pituitary gland, when injected into a cow, can increase its milk production from 10 to 350 per cent. was described by Dr. A. C. Fay, laboratory director of H. P. Hood & Sons.

The research is still in the experimental stage, he said, but it gives promise of great utility to the dairy industry. The importance of the dairy industry in the nation's food supply, it was pointed out, is tremendous, for of the ton of food consumed annually by each person in the United States, 45 per cent. is composed of dairy products.

Dr. Fay also outlined new tests the industry has devised for rapidly checking the quality of milk. Until now, 48 hours was needed, but the new tests can be run off in less than an hour. New methods have also facilitated the detection of improperly pasteurized milk, he said, again with an important saving of time.

Black Cans

Housewives may some day have to get used to black cans because of a tin shortage—a future possibility by no means remote—the Food Technology Conference learned from Prof. Robert S. Williams of the Massachusetts Institute of Technology.

"Tin is costly and is a strategic material of which we have no domestic supply," Dr. Williams remarked, in suggesting that America's canning industry, largest user of tin-plate in the world, get busy and look for a substitute.

A Parkerizing process, by which steel is coated with an impenetrable black oxide that resists corrosion, was suggested by the metallurgist as one possible situation.

The bulk of the world's tin comes from the Malay peninsula, on which Singapore, under British control, is located. Since tin is required for military purposes, a protracted European or Asiatic war might curtail the possibility of getting tin in sufficient quantities for America's gigantic tinning industry.

Raw Milk Causes Epidemics

Blame for 40 milk-borne epidemics a year in the United States was placed squarely on the use of raw milk by Dr. James A. Tobey, health department director for the Borden Company, who declared that these epidemics are "due chiefly to contaminated raw milk supplies in the smaller communities."

Forms of tuberculosis and undulant fever spread by infected cattle constitute a problem, but both hazards can be eliminated by universal pasteurization, he asserted.

About 88 per cent. of milk sold on the market in cities of 10,000 or more is pasteurized, "but the picture is less roseate in the smaller communities of this country. In places having populations between 1,000 and 10,000, only about 39 per cent. of the milk is now pasteurized, the proportion usually growing less and less as the population decreases.

"Efficient pasteurization of all market milk is an efficient sanitary measure."

Wider use of irradiated milk, rich in vitamin D which combats rickets, was urged by Dr. Tobey. "The more general use of vitamin D milks would tend further to reduce the incidence of rickets, a disease that is still one of our important public health problems."

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About 25 per cent of grape juice is sugar.

PSYCHOLOGY

"PQ" More Important Than "IQ" In Human Contacts

SCHOOL children and their parents have become familiar with the IQ measure of intelligence. Now psychologists are talking about PQ—personality quotient. For getting along with other people, PQ is more important than IQ.

The boy or girl with a high PQ stands pretty well as a leader among his associates, Dr. George K. Bennett, of the Psychological Corporation, told the meeting of the American Psychological Association. But scholarship has little to do with this rating. High PQ's are distributed among the good scholars and dumbbells alike.

Athletic games and sports appear to have their part in building the personality, or at least those taking part in them do have high PQ's, Dr. Bennett indicated.

Baseball, football, tennis and swimming are characteristic activities of the boys scoring high in PQ. Ice skating, tennis, swimming, and pingpong are the popular games of high PQ girls.

Some other games do not distinguish those with high PQ from those with low PQ. Pool and chess are no more popular with one type of boy than the other; bridge or other card games are popular with both types of girl.

Hobbies are just as popular among those weak in personality, Dr. Bennett said, possibly because they serve as an escape from mixing with other boys and girls.

The particular personality traits measured in Dr. Bennett's experiment are initiative, self-reliance, economic self-reliance, and adjustment to the opposite sex.

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CONSERVATION

Game Refuges No Help To Cyclic Game Species

REFUGES appear to be of no particular value for those species of game birds and mammals that increase and diminish in number according to that well-known but little understood phenomenon, the game cycle. Such would seem to be the meaning of results obtained by F. C. Edminster of Cornell University, in studies on two game areas in New York.

One of the areas was a regularly established game refuge, the other a pub-

lic shooting area. During winter weather, in three successive years, 1935, 1936, and 1937, Mr. Edminster tramped both areas, counting evidences of the presence of three sample game species, ruffed grouse, cottontail rabbit, and gray squirrel. He counted grouse actually seen, but found it easier to reckon up the tracks of the other two than to find the animals themselves.

In all three cases he found no evidence of more game life on the refuge than on the shooting area. In fact, several of his counts gave the shooting area a decidedly larger population. Between the 1935 and 1936 counts, the gray squirrels hit the downgoing side of their population cycle. The numbers dropped steeply, and almost equally on the two areas; 90.9 per cent. decline on the refuge, as against 91.0 per cent on the shooting area.

Mr. Edminster, reporting his results in the newly established *Journal of Wildlife Management*, concludes that "refuges are of no value in maintaining population of cyclic species such as the ruffed grouse, cottontail rabbit, and gray squirrel; fluctuations continue regardless of the protected or unprotected status of the coverts."

He sees some possible value in refuges, however, in case there is abnormally high hunting pressure on the species, as may happen in the neighborhood of large cities.

Science News Letter, September 25, 1937

HOROLOGY

Automatic Clocks To Add To Time Signal Service

TWO automatic crystal-controlled clocks are being built by the U. S. Naval Observatory for addition to its time-signal broadcasting service, Capt. J. F. Hellweg, Superintendent of the Observatory, reports in his synopsis of work for the fiscal year 1937.

Used to send out at frequent intervals time signals for mariners and scientists who find them indispensable, the clocks are intended for the naval stations at Mare Island, Calif., and Honolulu. Twenty time signals are sent each day from the Naval radio station at Arlington, Va., and five are broadcast from Mare Island. The signals sent out from other stations are automatically recorded at the Naval Observatory and are constantly checked for accuracy. Slight errors may mean serious irregularities in computations of scientific data.

Science News Letter, September 25, 1937

IN SCIENCE

GENERAL SCIENCE

Rockefeller Foundation Has Spent Large Fund In China

OVER a third of a million dollars to promote rural reconstruction in China was appropriated by the Rockefeller Foundation in 1936, the Foundation's report for that year, just published, shows. This appropriation was part of a relatively new Foundation activity known as the China program which was started in December, 1934. The program included "aid toward the creation of practical techniques in administration, education, agriculture, economics, health and medicine." The program was carried on in cooperation with responsible agencies.

Of the total \$11,300,000 given away by the Foundation during 1936, about one third went for projects in countries outside the United States. Over two million dollars was given to the International Health Division and more than one and one-half million dollars was given for medical projects. Of this latter sum, nearly three-fourths was devoted to problems of mental disease.

Science News Letter, September 25, 1937

ICHTHYOLOGY

Flying Fish, Like Airplanes, Prefer Taking Off Into Wind

FLYING fish, like airplanes, prefer to take off into the wind rather than with it, studies by Dr. Carl L. Hubbs of the University of Michigan have shown. In many observations by himself and his associates, flying fish of several species have been seen to take off almost always to windward when the wind was abeam of the ship that disturbed them. With either a head or a stern wind, the fish would take off to both port and starboard.

The observations confirmed the opinion long held by scientists that flying fish do not really fly, but hold their long plane-like fins rigid and glide through the air like sailplanes. The longest glides observed lasted about a quarter of a minute.

Science News Letter, September 25, 1937

THE FIELDS

ARCHAEOLOGY

2,000 Bones Mark Site Of Ancient American Feast

TWO THOUSAND knife-marked bones, remnants of ancient feasting in the northern lake region of Minnesota, have been discovered at a camp ground of America's earliest people.

Prof. A. E. Jenks of the University of Minnesota announced the find. (*Science*, Sept. 10) That the scene reveals very old inhabitants is indicated by identifying a kind of bison, long extinct on this continent, among the bones of bear, elk, caribou and other big game animals in the kitchen refuse. The feasters also left knives and other tools of bone and stone.

The kitchen dump, abandoned thousands of years ago, is buried three to nine feet under a bog of grasses and marsh weeds, in Itaska State Park. Prof. Jenks has been excavating the site in cooperation with the State Conservation Commission and the Federal Government.

Science News Letter, September 25, 1937

GENETICS

Worth of Sires Proved By Daughters' Records

BULLS are given milk- and cream-ratings in a new publication of the U. S. Department of Agriculture.

Not that the records were directly established. Modern agriculture has done a lot of very remarkable things, but as yet milk production remains a monopoly of the feminine members of the herd. Nevertheless the honors accorded to bulls in dairy breeds are based strictly on yield records.

The trick is done by studying the yields of daughters of the sires in question, comparing them with the yields of their own mothers made under similar conditions, and crediting the gain, if any, to the influence of "pa's folks." Thus if ten daughters of a given sire gave a milk-yield record of 10,000 pounds for the test period, while their mothers have a comparable record of 9,000 pounds, the thousand-pound difference is chalked up to the credit of the sire. This process is called "proving."

A proved sire with a good record as shown by his daughters' production performance is naturally in demand for the improvement of other herds of milch cows. But to some bulls come only posthumous honors: in the Agriculture Department's list many animals are recorded as having died before the proof period (which may require several years) could be completed. But many of them leave sons, which are sought after as suitably aristocratic alliances by owners of blooded dairy herds.

A list of this kind is as important to the dairy industry as the Almanach de Gotha is in European social circles. And of a great deal more significance as regards the health and actual worth in the world of the individuals registered.

Science News Letter, September 25, 1937

PUBLIC HEALTH

Cholera Knows No Racial Or Military Barriers

CHOLERA knows no military or racial barriers, as the Japanese troops in the Shanghai area are apparently now learning to their cost. Hygienic measures are the only barriers that can check its advance.

These measures are simple enough to apply under ordinary conditions. Boil all drinking water and cook all food thoroughly. Be careful that the boiled water, in the interval between boiling and drinking, is kept in clean containers untouched by flies, hands or anything else that might have cholera germs on it. The same applies to food.

In the melee of fighting around Shanghai it has probably been impossible for Japanese military authorities to enforce these measures for their troops. There is no need to suggest that the Chinese have resorted to "germ warfare" to explain the present cholera outbreak among the Japanese soldiers. An outbreak of the disease among the civilian Chinese and foreign population was reported from Shanghai at the end of August. Strictest supervision of food and water would be necessary, under such conditions, to prevent the spread of the disease across the lines into the Japanese army.

Cholera is caused by a microscopic organism, looking like a curved rod and called a vibrio. It is a highly fatal disease, common to the East, spread by contamination of food and water with excreta of cholera patients.

Anti-cholera vaccine gives protection against the disease for a short time.

Science News Letter, September 25, 1937

CARTOGRAPHY

Weather Bureau Chief Urges Standards For Maps

STANDARDIZED maps for showing the world's weather were urged before an international meteorological meeting at Salzburg, Austria, by Dr. W. R. Gregg, chief of the U. S. Weather Bureau. Dr. Gregg is president of the Commission on Projections for Meteorological Maps.

In his address, Dr. Gregg pointed to an analogy between map projections and standard time zoning. Along only one meridian of longitude in any particular time zone do solar time and standard time agree. Elsewhere, time is falsified. But the practical benefits more than offset the disadvantages of such falsification.

Similarly, any projection of the spherical surface of the earth on a flat map is correct along only one parallel of latitude. Everywhere else on the map there is spatial distortion. But the practical benefits offset the disadvantages.

Dr. Gregg and his colleagues of the commission recommend that the thirtieth and sixtieth parallels of latitude be adopted by all nations as projection bases for their weather maps. Standard reduction scales were also recommended.

Accompanying Dr. Gregg, as the other American delegate to the meeting, was Ivan R. Tannehill, chief of the marine division of the U. S. Weather Bureau. The two men also will represent the Weather Bureau at meetings of the commissions on climatology, agricultural meteorology, and synoptic weather.

Science News Letter, September 25, 1937

PHYSIOLOGY

Catalepsy In Cats Results From Heavy Water

CATS were given cataleptic fits when small quantities of heavy water (containing double-weight hydrogen atoms) were injected into their spinal cavities, Drs. Julian B. Herrman and Henry G. Barbour report. (*Science*, Sept. 10) Similar results were obtained in rats by removing a patch of skull under anesthesia, and putting the heavy water directly on the brain.

An animal or man in a cataleptic attack frequently takes rigid postures or even seems to be dead. The animals in the Yale experiments, however, all recovered fully.

Science News Letter, September 25, 1937

ASTRONOMY

Stellar Preview

Heavenly Stars Also Give Their Midnight Show As Foretaste of Next Month's Evening Attractions

By JAMES STOKLEY

STARGAZERS during October will turn their eyes to the low north-eastern sky. There two first magnitude stars are to be seen. One is Aldebaran, in Taurus, the bull; the other Capella, in Auriga, the charioteer. Aldebaran is distinctly red in color, while Capella is usually described as having a creamy-white hue.

In looking at Capella and Aldebaran, we are reminded that winter is but a few months off, for these are two of the brilliant assemblage of stars that we expect to see in the south when the ground is covered with snow. If we wait until later in the evening we shall see even more of them. By midnight they will have climbed considerably higher. Below Taurus, at that hour, a little south of the east point, will be seen the glorious constellation of Orion, recognized by three stars, in a vertical row, forming the belt of this warrior. Below Capella, then, a little farther north than Orion, will shine Pollux, in Gemini, the twins.

In November these constellations will be visible in the same position, not at midnight, but at nine or ten o'clock, so that by staying up a few hours later we can get a preview of the evening skies of November. It will be a correct preview as far as the stars are concerned. The planets, which are moving, will be differently arranged. Saturn, however, moves so slowly, that its motion against the starry background will not be appreciable.

Seeing The Future

If you want to look still farther into the future, and see the stars as they will appear on the evenings of December, it is only necessary to examine the October skies at 2:00 a. m. At 4:00 a. m. this month, you can see them for next January. In other words, each month the stars appear just two hours earlier than they did on the same date the preceding month.

This comes from the way the earth moves. The sun does not rise, move across the sky each day from east to west, and set! It is the earth that moves,

from west to east. As we are carried around on its surface, not conscious of its motion, the sky seems to turn in the opposite direction.

The western horizon is constantly climbing, the eastern descending, so it would be more correct to speak of "earth-rise" and "earth-set" than of sunset and sunrise. This also makes the stars come into view, apparently move across the sky, and disappear in the west. Thus, during the course of the 24 hours every star that we ever see is above our horizon, though the ones that are in the sky at the same time as the sun are invisible by reason of its glare.

In addition to turning on its axis, the earth also makes a circuit of the sun every year. Once again we are unaware of the earth's motion, and it seems as if the sun is moving. One might set up a post in a field, and walk around it in a large circle. It would be found that the background was constantly changing. With the observer to the south of the post, it would be seen against the background of objects to the north. When he was north himself, it would have a background of the things to the south. So, as the earth goes around the sun we see it against an ever-changing background of distant stars.

With the sun's background at present

the stars of Virgo, the virgin, this constellation is not visible. Next month the sun will, apparently, have moved a twelfth of its way around the sky, to the east, and its background will then be Libra, the scales. By the same token, the stars of Virgo that were in line with the sun in early October will then be a twelfth of the sky's circumference to the west. As it takes 24 hours for the sky to make its complete daily apparent rotation, these stars will then be about two hours ahead of the sun, and possibly they can be glimpsed in the early morning twilight.

By December first the sun will be still farther east, another twelfth of its way. It is then almost in the same direction as Antares, the bright red star in the constellation of the scorpion that was so prominent in the evening skies of summer. The stars of Virgo will then be a sixth of a circumference, or four hours, west of the sun, and they will rise that long before him. On January first they will be six hours ahead, on February first, eight hours, on March first, 10 hours. By the latter time they will be so far ahead of the sun that they will begin to appear in the evening. But finally they will be so far ahead that they will catch up to the sun—that is, the sun will have made its annual circuit, and again will be in line with them so that they will disappear from view once more.

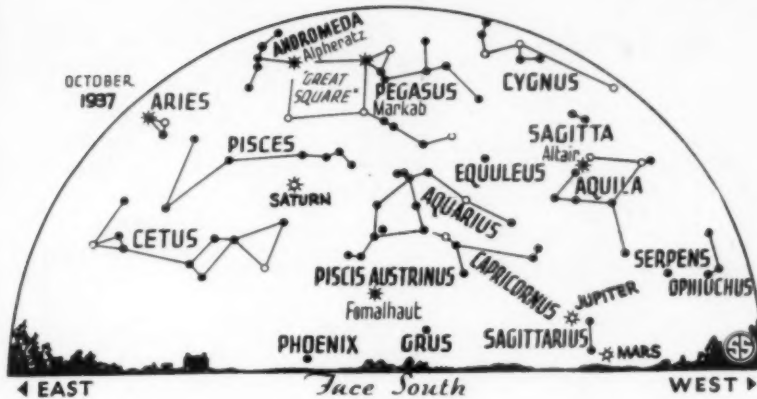
The planet Jupiter is the most brilliant of the objects seen in the October eve-

☉ * ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



NEAR THE ZENITH

Cygnus, the Swan, flies near the top of the sky.



LOW IN THE WEST

Sagittarius stands between Jupiter and Mars

ning skies. It is low in the southwest in the constellation of Sagittarius, the archer, where its brightness makes it easy to find. To the west, and lower, is another planet, Mars. The third planet now seen, Saturn, is in Pisces, the fishes, high in the southeast. It is the faintest of the three.

At about 10:00 p. m. on October 1, 9:00 p. m. on the 15th and 8:00 p. m. on the 31st, the skies appear as shown on the maps, and from these not only the planets, but the stars as well, may be located. A good place at which to start to learn these is with the figures of Pegasus, the winged horse, high in the south. In this constellation are shown four stars marked "great square." Actually, Alpheratz, in the upper left corner, is in the neighboring group of Andromeda, so here we have two already identified.

Fishes and a Horse

Follow the line of the two stars forming the right hand side of the square to the south, and you come to Fomalhaut, in Piscis Austrinus, the southern fish. Wrapped around the square, below, and to the left, is another figure made up of fishes, this time a pair, the constellation of Pisces. Between Piscis Austrinus and some of the stars of Pegasus, is Aquarius, the water carrier, while below Pisces is Cetus, the whale, making rather a strange assemblage of aquatic creatures. Nor are they all, for Capricornus, nearby, is a monster with the head and shoulders of a goat, and the tail of a fish, if we are to believe the way he is pictured on the old star maps, dating back to ancient times.

Next to Pegasus to the west is Cygnus, the swan, which forms a cross in the sky, the brilliant Deneb at the top. High in the southwest is Aquila, the eagle,

with another first magnitude star called Altair. Near it, on either side, are two fainter stars, Alschain to the left and Tarazed to the right. A little higher than Aquila, and farther north, is Lyra, the lyre. This contains the brightest star now to be seen, Vega.

Mars and Jupiter

Some interesting motions of the planets Mars and Jupiter may be seen this month. Until the end of the month Mars will be to the west of Jupiter, but if you watch them night after night, you will find that they are steadily approaching. On October 9, at noon, eastern standard time, when they are visible, Mars will pass Jupiter. After that the positions will be reversed. The moon, almost at first quarter, passes Mars on the 11th and Jupiter on the 12th, so at these dates the objects, close together, will form a striking trio.

In addition to the planets of the evening sky, two others can be seen in the morning hours. During the first few days of the month Mercury will be visible low in the southeast just before sunrise. Venus is also a "morning star," rising about two hours before the sun, and more brilliant than any other planet or star.

The phases of the moon are given below. From about the 10th to the 22nd there will be moonlight in the evenings. The full moon on the 19th is the "Hunter's Moon." At this time the delay of moonrise from one night to the next is less than usual during the year, though not as little as it was for the "Harvest Moon," the full moon of September. The moon will be closest the earth (at perigee) on October 21 at 11:00 a. m., and at its greatest distance (apogee) at 1:00 p. m. on the 9th. On the former date it will be 224,580 miles

from us, as compared with 251,680 miles on the latter.

Phases of the Moon

		E. S. T.
New Moon	Oct. 4	6:58 a. m.
First Quarter	12	10:47 a. m.
Full Moon	19	4:48 p. m.
Last Quarter	26	8:26 a. m.

Science News Letter, September 25, 1937

CONSERVATION

Seashore National Park To Preserve Beauty of Dunes

A HUNDRED square miles of natural seashore land in the Cape Hatteras region of North Carolina will become the first Seashore National Park, if present plans are realized. As outlined in *Science*, (Sept. 10) these call for the acquisition of the land, its presentation to the U. S. National Park Service, and the preservation of the unique and still unspoiled natural plant and animal life of the region.

Approximately 7,540 acres are already in Government hands, including 1,400 acres comprising Cape Hatteras State Park, 44 acres surrounding Cape Hatteras Light, 96 acres at Kitty Hawk, and 6,000 acres controlled by the U. S. Biological Survey.

Besides its scenic and natural history value, the proposed park also has rich historical background, running all the way from Sir Walter Raleigh's unsuccessful colony of 350 years ago to the first successful airplane flight, made in 1903 at Kitty Hawk.

Science News Letter, September 25, 1937

Nature originally provided the cow with only enough milk to take care of a calf, says the Consumers' Guide; but today, as a result of selective breeding, many cows provide enough milk to take care of 10 calves.

THERE IS FUN IN GEOMETRY

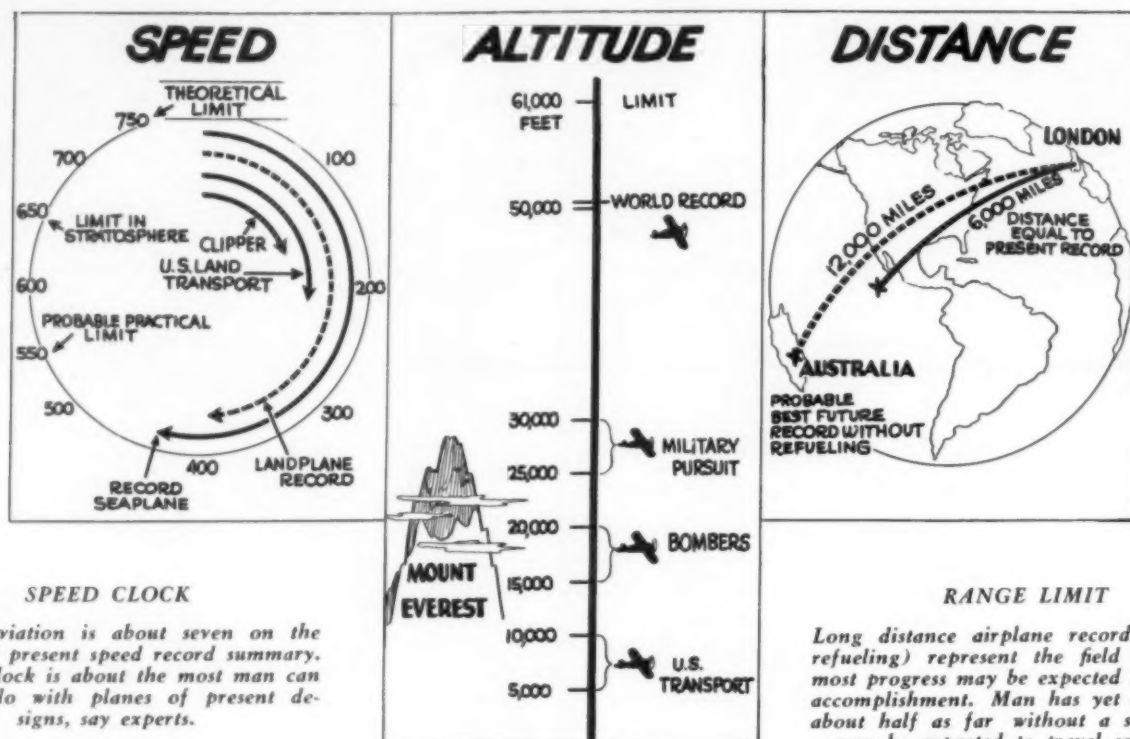
● By Louis Kasper

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SPEED CLOCK

Modern aviation is about seven on the "clock" of present speed record summary. Eleven o'clock is about the most man can hope to do with planes of present designs, say experts.

RANGE LIMIT

Long distance airplane records (without refueling) represent the field where the most progress may be expected in aviation accomplishment. Man has yet only flown about half as far without a stop as he may be expected to travel some day.

PUBLIC HEALTH

Infantile Paralysis Cases Continue To Mount

AMERICA'S wave of infantile paralysis has apparently not yet reached its peak, figures released by the U. S. Public Health Service indicate.

Eight hundred and seventeen new cases were reported during the week ended September 11 as against 641 the previous week. More than 5,500 cases in all have been reported by state health officials since the beginning of the outbreak. Up to the same time last year, 2,019 cases had been found.

(Meanwhile in Chicago the American Medical Association, through an editorial in its *Journal* (Sept. 18) scored pub-

ALTITUDE GAGE

How high can man fly with present type airplanes? The diagram above shows aircraft are now pretty near the "ceiling" around 61,000 feet.

licity given to the current outbreak. "There has only been new emphasis on poliomyelitis and perhaps too much publicity," it declared. "Without the over-emphasis in the press the vast majority of people would not have been concerned by the few hundreds of cases among many millions of people."

No definite results of medical value can be expected this year from the use of the widely-advertised zinc sulphate spray treatment as a preventive measure, the *Journal* also declares.

"In view of the tendency of infantile paralysis to become rapidly less prevalent about the end of September and early October, the futility of starting such procedures at this time is readily apparent. If the evidence obtained this year is in any way encouraging plans for determining the effectiveness of the attempted preventive might be worked out so that something resembling a serious scientific experiment may be tried next June, July and August."

Illinois continued to lead in the reports of new cases, 130 such having been diagnosed in that state during the last week as against 106 the week before. New York showed 91 cases, Ohio 66

and Massachusetts 44. No new cases were reported in the District of Columbia, where, health officials pointed out, it is possible that cold weather may have been a contributing factor in cutting the toll of the disease. Doctors in general, however, are not agreed on any interpretation of the effects of the weather on poliomyelitis.

Science News Letter, September 25, 1937

PHYSICS

Insulin Molecule Has Complicated Pattern

See Front Cover

MATHEMATICS, physics, chemistry and X-ray studies have given Dr. D. M. Wrinch of Oxford University's Mathematical Institute the model of the complicated insulin molecule, whose atoms are arranged in a crystalline pattern. The model is pictured on the front cover.

Science News Letter, September 25, 1937

The SEX TECHNIQUE IN MARRIAGE • By I. E. Hutton, M. D.



"Dr. Ira Wile describes the book as a clear, succinct, non-emotional, authoritative and conservative exposition of the practical factors involved in making marriage successful on the sexual level. That describes the book exactly . . . It is primarily concerned with the conduct of the honeymoon and with the technique of the sexual performance."

—Dr. Morris Fishbein, Editor *Journal American Medical Assn., in Hygiene.*

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SEASICKNESS

AVIATION

British Expert Predicts Speed and Altitude Limits

Theoretical Limits of Present Types of Aircraft, Practical Limits, and Present Records are Compared

THREE major aeronautical achievements within a month of one another have revived with new meaning the old question, "How far, how fast and how high can man fly in an airplane?"

Flight Lieutenant M. J. Adams of England has climbed in his plane to 53,937 feet. Three Soviet aviators have flown from Moscow to southern California, a non-stop flight of 6,338 miles. America's Pan-American Airways and Britain's Imperial Airways have successfully started a long series of test flights looking toward Trans-Atlantic commercial flying within the next year.

These men and the organizations behind them have succeeded in pushing the aerial frontier a little further away. How much further can they go? How near are airmen to the limit, if limit there be?

Here, in brief, is the present prediction of aviation experts answering this question of how fast, how far and how high a plane can go with a human being in it:

Speed: 550 miles an hour;

Altitude: 61,000 feet;

Distance: 12,400 miles without refueling.

The present world records in these three fields show, therefore, that for speed man has flown about 82 per cent. as fast as he ever will. In altitude the airplane has been pushed to about 88.5 per cent. of the "ceiling" and in distance about 50 per cent. toward the ultimate goal.

The predictions of the natural limits of human flight, here given, were made recently by one of Great Britain's best aeronautical authorities, H. E. Wimperis, director of scientific research for the British Air Ministry and president of the Royal Aeronautical Society.

Like any reliable and sane authority, Mr. Wimperis did not walk out on the limb of prediction without reservations. His predictions, he declared, applied to the present type of plane using an internal combustion engine. He allowed for invention of some totally new means

of flight, but pointed out that no such means has yet been more than hinted at.

Safest and most predictable of all the ultimates in the world's aviation records is that of speed. Using an aerial vehicle like the airplane which gets a continuous lift from the flow of air over and around the wings, scientists cannot envision a plane that will travel more than 750 miles an hour. This is the speed of sound waves. Actual practice sets the limit at a speed considerably lower than this.

The speed of sound waves and the limit for an airplane are linked because the speed at which a wave of compression in air will travel is 750 miles an hour. A sound wave is nothing but a wave of compression. When an airplane

is traveling less than 750 miles an hour, the air around the plane is compressed out of the plane's way before it gets there. If the plane, however, moves at the speed of the wave of compression or faster, the air molecules ahead cannot be "warned" or compressed out of the way, for the plane moves faster than the "warning."

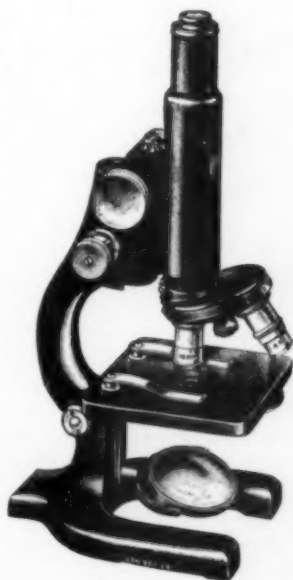
An automobile driver speeding through a crowded street faster than the sound waves from his horn, warning people to get out of the way, would be in a similar situation. Enormous friction loads, because of the abrupt collision of the air against the plane, would be developed. These friction loads, Mr. Wimperis believes, are greater than any engines, yet thought of, can cope with.

This theoretical limit is considerably lower in the stratosphere than it is at sea level. This may seem paradoxical, perhaps, to those who now live in an age when the trend to faster speeds seems to be in the high altitudes. But the answer to the paradox is that the speed of sound depends on the temperature of the air. The speed of sound falls with the decrease of temperature. At the air temperatures in the substrato-

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sphere the speed of sound is about 650 miles an hour.

For this reason Mr. Wimperis anticipates that as the speed limit is approached the record may be set at low altitudes. It is probable that records will be over 500 but less than 600 m.p.h.

Twenty thousand kilometers or 12,400 miles, a little more than half way around the earth, has been set by fuel experts as the maximum distance a plane can go on a single load of gasoline. When that point is reached, the internal combustion engine will be hauling its largest theoretical load; beyond that the present type of motor cannot be improved. This forecast, perhaps the most precarious of the lot, is based on the knowledge that for engines having given efficiency, using fuels of specific characteristics, the maximum possible ton-miles per gallon of fuel tends to be independent of altitude. Under still air conditions there is no advantage in flying higher to beat distance records.

The fact that a plane has a "ceiling" of 61,000 feet depends on another fact—that the air at 61,000 feet is so thin that supplying oxygen to the engine becomes a problem that cannot be solved with the means at our command today or likely to be in the near future.

But men may yet design means of flying totally different from those we now know and in that way achieve what appears impossible today. "By assembling this row of aeronautical ninetpins," Mr. Wimperis declares, "I encourage the resourcefulness of coming generations by providing them with the zest of knocking them down."

Science News Letter, September 25, 1937

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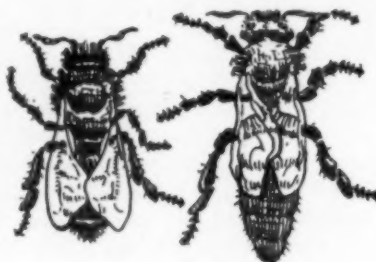
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ENTOMOLOGY NATURE RAMBLINGS by Frank Thone



Widows' Sons

WIDOWS' sons are proverbially drones. It doesn't matter that in human society that proverb is a libel; it sticks anyhow. But in the beehive the drones are of necessity sons of a widow. And paradoxically, even though that widow has once had a mate, her male offspring never had a father.

Queen bees are all widows. When a young queen is ready for mating, she leaves the hive and flies high in the air, with a whole flock of males in pursuit. One captures her and weds her—and pays for his success with his life, for his reproductive organs are torn from his body and he falls to earth and dies of the mutilation. The queen then returns to the hive, always to meet the deadly hostility of her mother.

If she is not killed by the jealous older queen, she founds a new colony, taking part of the old swarm with her. Within her body she has the beginnings of all the eggs she will ever lay—many thousands of them. She also has, stored in a special sac, the male germ cells she received from her departed mate. They will remain alive and able to fertilize her eggs as long as she herself lives, usually several years.

In some way, the queen is able to control the outlet of this storage sac of sperm cells, so that she can lay fertilized eggs or not as she chooses. Usually she permits the eggs to be fertilized, and those fertilized eggs always develop as females, for the male germ cell contains the particular "gene" or hereditary unit that determines femaleness in the offspring. These females become workers or queens, depending on how they are fed during the larval or grub stage.

Such eggs as the queen passes from her body without fertilizing invariably produce males or drones. Without the

"sex chromosome" of the male cell they cannot be females. Thus we have the peculiar phenomenon of bee fathers able to have only daughters, bee mothers able to have sons without the aid of fathers, but able to produce daughters only with the aid of fathers.

The paradox of the beehive does not end even here. If through some misfortune the queen dies there can be no more workers, for the queen is the only possible source of worker eggs. If there happen to be any eggs or very young larvae in the brood cells the workers can remedy this situation by feeding suitable food to produce a new queen.

But if this is not possible a strange thing happens. Some workers (which are undeveloped females, and of course unmated), begin to produce a few eggs, which they tend very carefully. But since these eggs are unfertilized they inevitably produce nothing but drones; and the poor workers are incapable of mating with them. So it is all a gesture of futility, and the colony is doomed to eventual extinction.

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RADIO

September 28, 5:15 p. m., E.S.T.

DISEASES OUTSIDE OUR DOOR—Dr. C. V. Akin, Chief Quarantine Officer for the Port of New York.

October 5, 5:15 p. m., E.S.T.

SALT OF THE EARTH—Miss F. E. Harris of the U. S. Department of Interior.

In the Science Service series of radio discussions over the Columbia Broadcasting System.

BULBS

THE Post Office Department has taken action against individuals and concerns located at Vogelenzang, near Haarlem, Holland, who have advertised in various American publications that they will send bulbs at a low price if money is remitted to them. Evidence satisfactory to the Postmaster General has caused him to issue fraud orders which will prevent the delivery of mail and postal money orders to such persons. Subscribers to the SCIENCE NEWS LETTER are advised not to respond to such advertisements without further inquiries in which we will be glad to cooperate. The Post Office evidence indicates that one person or a group of persons is using various names in this connection.

Which Brands Are Best Buys?

Consumers Union Reports, monthly publication of Consumers Union of United States, gives you the results of unbiased tests on the products listed below in current issues—in most cases with ratings as "Best Buys," "Also Acceptable," and "Not Acceptable."

Photographic Films

EXPOSURE METERS, RANGE FINDERS, FILTERS, TRIPODS and SYNCHRONIZERS

Six separate reports prepared by photographic experts compare the quality and the value of leading brands of the six types of photographic equipment listed above. Ratings are given in some cases under the headings, "Best Buys," "Also Acceptable," and "Not Acceptable." Reports in previous issues (still available—see coupon below) gave comparisons of over 60 makes of miniature and non-miniature cameras.

Auto Radios

One of the 14 models in this report is rated as a "Best Buy." Two are "Not Acceptable." Arvin, Motorola, and Philco models are included in the ratings. In addition to ratings on the basis of price and quality, rankings are given on the basis of performance alone. Advice is also given on which type of auto aerial to use.

Breakfast Cereals

If Barnum Were Alive . . .

He would probably find a career in cereals, where circus tactics outweigh actual virtues as sales appeals, to his liking. A report on 37 brands, including Quaker Oats, Shredded Wheat and Grape Nuts, shows most cereals to be cheap foods in expensive forms; gives tables showing the relative costs of brands in terms of the number of calories one cent will buy. A cent will buy from as little as 36 calories to as much as 275 calories depending on the brand you select.

Mechanical Refrigerators

Ratings of 1937 Models

Twenty-one models of the 1937 makes of mechanical refrigerators are rated as "Best Buys," "Also Acceptable," and "Not Acceptable." Included in the ratings are the Norge, General Electric, Frigidaire, Kelvinator and Westinghouse. Prospective purchasers of refrigerators can make substantial savings—on operating costs as well as on the original purchase price—by following the advice given in this report.

Ice Cream

Bulk or Package?

Between a pint of ice cream in bulk and a pint of package ice cream there is on the average a difference of six ounces in weight, this survey of 23 samples of ice cream shows. Samples were tested for bacterial contamination, butterfat content, flavor and texture, and comparative economy on a weight basis.

Women's Slips

Some Are Part Lead

27 rayon and silk slips, ranging in price from 69c to \$2.98, are rated on the basis of tests. A few brands were heavily weighted with lead or tin salts, a few were misleadingly labeled.

Inner Tubes

Tested for thickness, volume and weight of rubber, tensile strength and elasticity, resistance to aging and other factors, 23 brands of inner tubes—including such brands as Lee, Seiberling, Mohawk, Firestone, Goodrich and Goodyear—are rated twice: first for quality, then for quality and price. Only 3 brands are listed as "Best Buys."

Oil Burners & Coal Stokers

Engineers' Advice on Heating Systems

Numerous makes of automatic oil and coal heating equipment are compared and rated on the score of efficiency and economy. Nearly a hundred makes of oil burners, coal stokers, boilers, and hand-fired coal furnaces are rated as "Best Buys," "Also Acceptable," and "Not Acceptable."

Winter Motor Oils,

Household Oils & Typewriters

Three reports give ratings of winter motor oils and household oils and preliminary recommendations on portable typewriters for the benefit of students and others who must buy a machine this month. Next month's issue will report in full the results of extensive tests on portable models of the best known machines.

LET EXPERTS WORK FOR YOU

Consumers Union of United States, which publishes *Consumers Union Reports*, is a non-profit, membership organization with 40,000 members throughout the United States. It is controlled entirely by its members and is sponsored by over 70 nationally famous scientists, educators, government officials, editors and authors. Each month in *Consumers Union Reports* the results of unprejudiced tests of the comparative value of such products as automobiles, shoes, radios, cameras, etc., are given with ratings in terms of brand names.

By mailing the coupon below you can immediately secure a copy of the current issues with the reports listed above. (Or, if you wish you can start your membership with any of the previous issues listed in the coupon). The membership fee of \$3 which brings you twelve monthly issues of the *Reports* also brings you without extra charge the 1937 240-page *Consumers Union Buying Guide* which lists more than a thousand products as "Best Buys," "Also Acceptable," and "Not Acceptable." Information from many Consumers Union members indicates that the regular use of these *Reports* and the *Buying Guide* can save the average family from \$50 to \$300 a year.

To: CONSUMERS UNION of United States, Inc.
35 Vandam Street, New York, N. Y.

I hereby apply for membership in Consumers Union.
I enclose:

☐ \$3 for one year's membership, \$2.50 of which is for a year's subscription to the complete edition of *Consumers Union Reports*.

☐ \$1 for one year's membership, 50c of which is for a year's subscription to the limited edition of *Consumers Union Reports*. (Note: Reports on higher-priced products are not in this edition.) I agree to keep confidential all material sent to me which is so designated.

Signature

Address

City & State Occupation

L-9

Start WITH ANY OF THESE ISSUES:

Please check the issue or issues with which you wish your membership to begin.

☐ Dec.—Fountain Pens, Vacuum Cleaners, Blankets.

☐ Jan.-Feb.—Men's Suits, Cold Remedies, Shaving Creams.

☐ March—Autos, Flour, Face Powders.

☐ April—Shirts, Cold Creams, Gardening.

☐ May—Trailers, Washing Machines, and the first of a series of articles on the causes and treatment of constipation.

☐ June—Large Cameras, House Dresses, Radio Tubes, Sanitary Napkins.

☐ July—Miniature Cameras, Gasolines, Golf Balls, Tennis Balls & Rackets, Motor Oils.

☐ Aug.-Sept. — Refrigerators, Photographic Films, Ice Cream, Inner Tubes, Raincoats.

☐ Oct.—Oil Burners & Coal Stokers, Auto Radios, Breakfast Cereals, Women's Slips, Price-Fixing.

•First Glances at New Books

Medicine—History

EARLY MEDIEVAL MEDICINE: WITH SPECIAL REFERENCE TO FRANCE AND CHARTRES—Loren C. MacKinney—*Johns Hopkins*, 247 p., \$2.75. This interesting book, compiled from the Hideyo Noguchi Lectures by the author at the Institute of the History of Medicine of the Johns Hopkins University, is unusual because it describes the dark ages of medicine and thus gives the necessary background for complete understanding of the triumphant progress of medicine about which so much has been written. Numerous notes and plates from ancient medieval treatises supplement the text.

Science News Letter, September 25, 1937

Physiology

AN OUTLINE OF GENERAL PHYSIOLOGY—L. V. Heilbrunn—*Saunders*, 603 p., \$5. This new physiology text book, written because the author, associate professor of zoology in the University of Pennsylvania, was dissatisfied with existing texts for his classes, may fill a need felt by other teachers. The author has attempted to give his students an outline both of what is known and of what remains to be discovered in the field of physiology.

Science News Letter, September 25, 1937

Animal Nutrition

PRINCIPLES OF FEEDING FARM ANIMALS (REV. ED.)—Sleeter Bull and W. E. Carroll—*Macmillan*, 395 p., \$3.50. A new edition of a successful textbook covering an important phase of animal husbandry.

Science News Letter, September 25, 1937

Ethnology

CULTURE ELEMENT DISTRIBUTIONS: IV. POMO—E. W. Gifford and A. L. Kroeber—*Univ. of Calif.*, 254 p., \$1.50. An analysis of traits found among certain California Indians.

Science News Letter, September 25, 1937

Public Health—Children

CHILD LABOR AND THE NATION'S HEALTH—S. Adolphus Knopf—*Christopher*, 32 p., 50 c. Written to promote ratification of the Child Labor Amendment.

Science News Letter, September 25, 1937

Archaeology

ARCHAEOLOGY OF ST. LAWRENCE ISLAND, ALASKA—Henry B. Collins, Jr.—*Smithsonian Institution*, 431 p., illus., \$2. A formal report of Mr. Collins' important discoveries at village sites represent-

ing sequences in Eskimo culture, and providing clues to a northern Eurasian origin for these mysterious people. The expeditions were in 1930 and 1931; and substantially this report won for Mr. Collins a Danish academy medal. See SNL Dec. 6, 1930.

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Dental Anatomy

HISTORY OF THE HUMAN TEETH: AN INTRODUCTION TO COMPARATIVE DENTAL ANATOMY—Cleveland Sylvester Simkins—*Blakiston's*, 329 p., illus., \$4. All about teeth of men and other animals, modern and stone age. This is said to be the first book in English that compares teeth of living animals and man with those of prehistoric animals and man. Unfortunately, it is too technical for the lay reader, but it is to be hoped the author will write a lay book on the subject some day.

Science News Letter, September 25, 1937

Philosophy

THE QUESTIONING MIND—Rupert Clendon Lodge—*Dutton*, 312 p., \$2.75. A book on popular philosophy, or rather, one written with the aim of stimulating the average person to do some philosophizing of his own. The author disclaims any ambition of reaching final answers, but hopes that the reflective reader will be rewarded with a sense of "satisfying steadiness of advance."

Science News Letter, September 25, 1937

Engineering

AIR CONDITIONING IN THE HOME—Elmer Torok—*Industrial Press*, 296 p., illus., \$3. Many people who are building a home or are remodeling are thinking at least vaguely about the use of air-conditioning. This book, by a competent engineer, answers almost all the possible questions which one might have.

Science News Letter, September 25, 1937

Engineering

PUBLIC WORKS ENGINEERS' YEARBOOK, 1937. PROCEEDINGS OF AMERICAN SOCIETY OF MUNICIPAL ENGINEERS, INTERNATIONAL ASSOCIATION OF PUBLIC WORKS OFFICIALS. 1936 PUBLIC WORKS CONGRESS HELD AT TORONTO, CANADA, SEPT. 28-30, OCT. 1, 1936—*American Public Works Association*, 300 p., \$3. Reprints of the papers presented at the Engineers' Convention mentioned in the title.

Science News Letter, September 25, 1937

Zoology

WILD ANIMAL WORLD: BEHIND THE SCENES AT THE ZOO—Raymond L. Ditmars and William Bridges—*Appleton-Century*, 302 p., illus., \$3. Many strange and curious things go on in that place where all the ends of the animate world meet—the zoo. In this book two "oldest inhabitants" of the New York Zoological Park give us fascinating glimpses of events—often dramatic, often comic—that the casual zoo-seer doesn't get a chance to see.

Science News Letter, September 25, 1937

Zoology

GREAT HISTORIC ANIMALS, MAINLY ABOUT WOLVES—Ernest Thompson Seton—*Scribner*, 320 p., illus., \$2.50. Seton can tell real thrillers, that everybody knows who knows animal stories at all; and where can you get more hair-raising thrills than out of a wolf story? Stories of great wolves of olden times in Ireland and France, of wolves just as great that still live and kill in our own North. With some tales of bears and great cats and apes, by way of good measure.

Science News Letter, September 25, 1937

Animal Training

ELIAS VAIL TRAINS GUN DOGS—Ella B. Moffit—*Orange Judd*, 219 p., illus., \$3. How a master trainer makes dogs valuable to sportsmen, explained and pictured so well that any patient and intelligent dog owner by following the suggestions can train his own animals.

Science News Letter, September 25, 1937

Conservation

LES PARCS NATIONAUX ET LA PROTECTION DE LA NATURE—Sa Majesté le Roi Albert, 88 p., 33.50 fr.

EXPLORATION DU PARC NATIONAL ALBERT: MISSION G. F. DE WITTE (1933-1935), Fasc. 1: Introduction—G. F. Dewitte, 39 p., 32 pl., folded map, 120 fr. Two publications on recent developments in the great Belgian national parks in Africa. Prices quoted are in Belgian francs; obtainable only from the *Institut des Parcs Nationaux du Congo Belge*, Rue Montoyer, 21, Bruxelles.

Science News Letter, September 25, 1937

Conservation

THE JOURNAL OF WILDLIFE MANAGEMENT, Vol. 1, Nos. 1-2, July, 1937—*Wildlife Society, Menasha, Wisconsin*, \$3 per year, 75 c. per copy. See page 200.

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